

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (currently amended): An image pickup device  
2 comprising:  
3 a solid-state imaging element;  
4 driving means for driving said solid-state imaging  
5 element;  
6 overflow level setting means for controlling a  
7 substrate bias voltage of said solid-state imaging  
8 element in order to variably set an overflow level of a  
9 charge accumulating portion of the solid-state imaging  
10 element, the overflow level being determined according to  
11 the substrate bias voltage; and  
12 reading control means capable of reading pixel  
13 charges as an output signal by means of said driving  
14 means in a normal driving mode in which individual pixel  
15 charges of said solid-state imaging element are read  
16 separately, one at a time, or in an n-addition driving  
17 mode in which a specific number "n" of pixel charges in  
18 the vertical direction of said solid-state imaging  
19 element are added and then read, wherein  
20 said overflow level setting means controls said  
21 substrate bias voltage to a different value, depending on  
22 whether the reading control means reads the pixel charges  
23 in said normal driving mode or in said n-addition driving  
24 mode.

1 Claim 2 (original): The image pickup device according to  
2 claim 1, wherein said overflow level setting means  
3 controls said substrate bias voltage based on a  
4 relationship between the overflow level of the charge  
5 accumulating portion and a saturated level of a  
6 horizontal transfer path included in said solid-state  
7 imaging element.

1 Claim 3 (original): The image pickup device according to  
2 claim 1, further comprising storage means in which  
3 adjustment information about said substrate bias voltage  
4 in said n-addition driving mode created based on a  
5 measured value of the relationship between the overflow  
6 level of said charge accumulating portion of said solid-  
7 state imaging element and the substrate bias voltage is  
8 stored beforehand, and wherein  
9       said overflow level setting means controls said  
10 substrate bias voltage in said n-addition driving mode  
11 based on the adjustment information in said storage  
12 means.

1 Claim 4 (currently amended): An image pickup device  
2 comprising:  
3       a solid-state imaging element;  
4       driving means for driving said solid-state imaging  
5 element;

6 overflow level setting means for controlling a  
7 substrate bias voltage of said solid-state imaging  
8 element in order to variably set an overflow level of a  
9 charge accumulating portion of the solid-state imaging  
10 element, the overflow level being determined according to  
11 the substrate bias voltage; and

12 reading control means capable of reading pixel  
13 charges as an output signal by means of said driving  
14 means in a selected one of (A) an n-addition driving mode  
15 in which a specific number "n" of pixel charges in a  
16 vertical direction of said solid-state imaging element  
17 are added and then read and (B) a non-addition driving  
18 mode in which individual pixel charges of the imaging  
19 device are read separately, one at a time, wherein

20 said overflow level setting means controls said  
21 substrate bias voltage to a different value according to  
22 the value of "n" in the n-addition driving mode by said  
23 reading control means.

1 Claim 5 (original): The image pickup device according to  
2 claim 4, wherein said overflow level setting means  
3 controls said substrate bias voltage based on a  
4 relationship between the overflow level of the charge  
5 accumulating portion and a saturated level of a  
6 horizontal transfer path included in said solid-state  
7 imaging element.

1 Claim 6 (original): The image pickup device according to  
2 claim 4, further comprising storage means in which  
3 adjustment information about said substrate bias voltage  
4 in said n-addition driving mode created based on a  
5 measured value of the relationship between the overflow  
6 level of said charge accumulating portion of said solid-  
7 state imaging element and the substrate bias voltage is  
8 stored beforehand, and wherein  
9       said overflow level setting means controls said  
10 substrate bias voltage in said n-addition driving mode  
11 based on the adjustment information in said storage  
12 means.

Claims 7-10 (canceled)

1 Claim 11 (original): A driving device of a solid-state  
2 imaging device comprising:  
3       a driving unit configured to drive the solid-state  
4 imaging device in an addition driving mode in which a  
5 plurality of pixels are added and read as a single pixel;  
6 and  
7       a substrate bias voltage supply configured to apply  
8 a bias voltage to a substrate of the solid-state imaging  
9 device according to the number of pixels added by said  
10 driving unit.

1 Claim 12 (original): The driving device according to  
2 claim 11, wherein said driving unit supplies to the  
3 solid-state imaging device such a driving pulse as adds  
4 a specific number (n: an integer equal to or larger than  
5 2) of pixel charges in a vertical direction of the solid-  
6 state imaging device and reads a result of addition.

Claims 13-29 (canceled)

1 Claim 30 (new): The image pickup device of claim 1  
2 wherein said overflow level setting means sets said  
3 substrate bias voltage to a first value if the reading  
4 control means reads the pixel charges in said normal  
5 driving mode and a second value, which is different from  
6 the first value, if the reading control means reads the  
7 pixel charges in said n-addition driving mode.

1 Claim 31 (new): The image pickup device of claim 30  
2 wherein the first value of the substrate bias voltage is  
3 lower than the second value of the substrate bias  
4 voltage.

1 Claim 32 (new): The image pickup device of claim 1  
2 wherein, in said normal driving mode, vertical transfer  
3 driving is performed once in each horizontal blanking  
4 interval, and

5        wherein, in said n-addition driving mode, vertical  
6        transfer driving is performed n-times in each horizontal  
7        blanking interval.

1        Claim 33 (new):    The image pickup device of claim 32  
2        wherein each horizontal blanking interval is the same.

1        Claim 34 (new):    The image pickup device of claim 4  
2        wherein "n" in the n-addition driving mode is at least  
3        two, and wherein said overflow level setting means sets  
4        said substrate bias voltage to a first value for a first  
5        value of "n" and to a second value for a second value of  
6        "n", wherein the first value of "n" is lower than the  
7        second value of "n" and wherein the first value of the  
8        substrate bias voltage is lower than the second value of  
9        the substrate bias voltage.

1        Claim 35 (new):    The image pickup device of claim 4  
2        wherein, in said normal driving mode, vertical transfer  
3        driving is performed once in each horizontal blanking  
4        interval, and

5        wherein, in said n-addition driving mode, vertical  
6        transfer driving is performed n-times in each horizontal  
7        blanking interval.

1        Claim 36 (new):    The image pickup device of claim 35  
2        wherein each horizontal blanking interval is the same.